

MAC 9693
PATENT

Claims:

1. (currently amended) A sulfur dioxide gas generating and gas releasing monolayer article consisting essentially of between 30.0% and 99.9% by weight of a polymer and between 0.1% and 70.0% by weight of a gas generating solid dispersed in the polymer, wherein the article is free of an acid, a polymer that degrades to produce an acid, a compound that generates an acid in response to humidity, a hygroscopic compound, and an oxidant, the gas generating solid being capable of generating and releasing sulfur dioxide gas upon exposure of the article to moisture, wherein the article has a thickness of between about 5 μm and 1000 μm .
2. (original) The article of claim 1 wherein the gas generating solid is capable of generating and releasing a second gas selected from at least one of chlorine dioxide, carbon dioxide, ozone, nitrous oxide, chlorine and hydrogen peroxide.
3. (original) The article of claim 2 wherein the gas generating solid is capable of generating and releasing a mixture of sulfur dioxide and chlorine dioxide.
4. (original) The article of claim 1 wherein the gas generating and releasing solid is between 10.0% and 60.0% by weight.
5. (currently amended) The article of claim 1 wherein the gas generating solid consists essentially of a sulfur dioxide gas generating and releasing salt and at least one component selected from an electromagnetic energy-activated gas generating and releasing component, an organic moisture-activated gas generating and releasing component and an inorganic moisture-activated gas generating and releasing component.
6. (original) The article of claim 1 wherein the gas generating solid consists essentially of a sulfur dioxide gas generating and releasing salt.
7. (original) The article of claim 6 wherein the sulfur dioxide gas generating and releasing

MAC 9693
PATENT

salt is selected from sodium bisulfite, potassium bisulfite, lithium bisulfite, calcium bisulfite, sodium metabisulfite, potassium metabisulfite, lithium metabisulfite, calcium metabisulfite, sodium sulfite and potassium sulfite.

8. (original) The article of claim 7 wherein the sulfur dioxide gas generating and releasing salt is selected from sodium metabisulfite, potassium metabisulfite, lithium metabisulfite and calcium metabisulfite.

9. (original) The article of claim 1 wherein the polymer is selected from polyolefins, polyvinyl chloride, nitrile, nylon, polyethylene terephthalate, polyurethane, polytetrafluoroethylene, silicone rubber, neoprene and polyvinylidene chloride.

10. (original) The article of claim 9 wherein the polymer is formed from a resin having a melt index between about 0.5 and about 8.0.

11. (original) The article of claim 9 wherein the polymer is formed from a resin having a melt temperature between about 105°C and about 150°C.

12. (original) The article of claim 9 wherein the polymer is a polyolefin selected from one or more of polyethylene, butene base, heptene base, octene base and metalocene polyethylene.

13. (original) The article of claim 1 wherein the article is selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.

14. (original) A bi-layer gas generating and releasing article formed from the article of claim 1 and a second article wherein a first surface of the article of claim 1 is conjoined with a surface of the second article.

15. (currently amended) The bi-layer article of claim 14 wherein the second article releases a gas upon exposure to moisture or electromagnetic energy.

MAC 9693
PATENT

16. (original) The bi-layer article of claim 14 wherein the second article does not release a gas.

17. (original) The bi-layer article of claim 14 wherein the second article is selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.

18. (original) A multi-layer gas generating and releasing article formed from the article of claim 1, a second article and a third article wherein a first surface of the article of claim 1 is conjoined with a surface of the second article and a second surface of the article of claim 1 is conjoined with a surface of the third article.

19. (original) The multi-layer article of claim 18 wherein the second article and the third article do not release a gas.

20. (currently amended) The multi-layer article of claim 18 wherein the second article releases a gas upon exposure to moisture or electromagnetic energy and the third article does not release a gas.

21. (currently amended) The multi-layer article of claim 18 wherein the second article and the third article independently release a gas upon exposure to moisture or electromagnetic energy.

22. (original) The multi-layer article of claim 18 wherein the second article and the third article are independently selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.

23. (currently amended) A gas generating and gas releasing monolayer article comprising between 30.0% and 99.9% by weight of a first polymer and between 0.1% and 70.0% by weight of a gas generating solid dispersed in the polymer, wherein the article is free of an acid, a second

MAC 9693
PATENT

polymer, a compound that generates an acid in response to humidity, a hygroscopic compound, and an oxidant, the gas generating solid consisting essentially of one or more gas generating and releasing components with at least one component being capable of generating and releasing at least one gas upon exposure of the article to moisture, wherein the article has a thickness of between about 5 μm and 1000 μm .

24. (original) The article of claim 23 wherein the gas is selected from at least one of sulfur dioxide, chlorine dioxide, carbon dioxide, ozone, nitrous oxide, chlorine and hydrogen peroxide.

25. (original) The article of claim 24 wherein the gas is a mixture of sulfur dioxide and chlorine dioxide.

26. (previously presented) The article of claim 24 wherein the gas is sulfur dioxide.

27. (original) The article of claim 23 wherein the gas generating and releasing solid is between 10.0% and 60.0% by weight.

28. (currently amended) The article of claim 23 wherein the gas generating solid consists essentially of a sulfur dioxide gas generating and releasing salt component and at least one component selected from an electromagnetic energy-activated gas generating and releasing component, an organic gas generating and releasing component and an inorganic gas generating and releasing component.

29. (original) The article of claim 23 wherein the gas generating solid consists essentially of a sulfur dioxide gas generating and releasing salt component.

30. (original) The article of claim 29 wherein the sulfur dioxide gas generating and releasing salt component is selected from sodium bisulfite, potassium bisulfite, lithium bisulfite, calcium bisulfite, sodium metabisulfite, potassium metabisulfite, lithium metabisulfite, calcium metabisulfite, sodium sulfite and potassium sulfite.

MAC 9693
PATENT

31. (original) The article of claim 30 wherein the sulfur dioxide gas generating and releasing salt component is selected from sodium metabisulfite, potassium metabisulfite, lithium metabisulfite and calcium metabisulfite.
32. (original) The article of claim 23 wherein the first polymer is selected from polyolefins, polyvinyl chloride, nitrile, nylon, polyethylene terephthalate, polyurethane, polytetrafluoroethylene, silicone rubber, neoprene and polyvinylidene chloride.
33. (original) The article of claim 32 wherein the first polymer is formed from a resin having a melt index between about 0.5 and about 8.0.
34. (original) The article of claim 32 wherein the first polymer is formed from a resin having a melt temperature between about 105°C and about 150°C.
35. (original) The article of claim 32 wherein the first polymer is a polyolefin selected from one or more of polyethylene, butene base, heptene base, octene base and metalacene polyethylene.
36. (original) The article of claim 23 wherein the article is selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.
37. (original) A bi-layer gas generating and releasing article formed from the article of claim 23 and a second article wherein a first surface of the article of claim 23 is conjoined with a surface of the second article.
38. (currently amended) The bi-layer article of claim 37 wherein the second article releases a gas upon exposure to moisture or electromagnetic energy.
39. (original) The bi-layer article of claim 37 wherein the second article does not release a

MAC 9693
PATENT

gas.

40. (original) The bi-layer article of claim 37 wherein the second article is selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.

41. (original) A multi-layer gas generating and releasing article formed from the article of claim 23, a second article and a third article wherein a first surface of the article of claim 23 is conjoined with a surface of the second article and a second surface of the article of claim 23 is conjoined with a surface of the third article.

42. (original) The multi-layer article of claim 41 wherein the second article and the third article do not release a gas.

43. (currently amended) The multi-layer article of claim 41 wherein the second article releases a gas upon exposure to moisture or electromagnetic energy and the third article does not release a gas.

44. (currently amended) The multi-layer article of claim 41 wherein the second article and the third article independently release a gas upon exposure to moisture or electromagnetic energy.

45. (original) The multi-layer article of claim 41 wherein the second article and the third article are independently selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.

46. (currently amended) A gas generating and gas releasing article comprising between 30.0% and 99.9% by weight of a first polymer and between 0.1% and 70.0% by weight of a gas generating solid dispersed in the polymer, wherein the article is free of an acid, a second polymer, a compound that generates an acid in response to humidity, a hygroscopic compound, and an oxidant, the gas generating solid consisting essentially of one or more gas generating and

MAC 9693
PATENT

releasing components with at least one component being capable of generating and releasing at least one gas upon exposure of the article to moisture, wherein the article has a thickness of between about 5 μm and 1000 μm .

47. (original) The article of claim 46 wherein the gas is selected from at least one of sulfur dioxide, chlorine dioxide, carbon dioxide, ozone, nitrous oxide, chlorine and hydrogen peroxide.

48. (original) The article of claim 47 wherein the gas is a mixture of sulfur dioxide and chlorine dioxide.

49. (previously presented) The article of claim 47 wherein the gas is sulfur dioxide.

50. (original) The article of claim 46 wherein the gas generating and releasing solid is between 10.0% and 60.0% by weight.

51. (currently amended) The article of claim 46 wherein the gas generating solid consists essentially of a sulfur dioxide gas generating and releasing salt component and at least one component selected from an electromagnetic energy-activated gas generating and releasing component, an organic gas generating and releasing component and an inorganic gas generating and releasing component.

52. (original) The article of claim 46 wherein the gas generating solid consists essentially of a sulfur dioxide gas generating and releasing salt component.

53. (original) The article of claim 52 wherein the sulfur dioxide gas generating and releasing salt component is selected from sodium bisulfite, potassium bisulfite, lithium bisulfite, calcium bisulfite, sodium metabisulfite, potassium metabisulfite, lithium metabisulfite, calcium metabisulfite, sodium sulfite and potassium sulfite.

54. (original) The article of claim 53 wherein the sulfur dioxide gas generating and releasing

MAC 9693
PATENT

salt component is selected from sodium metabisulfite, potassium metabisulfite, lithium metabisulfite and calcium metabisulfite.

55. (original) The article of claim 46 wherein the first polymer is selected from polyolefins, polyvinyl chloride, nitrile, nylon, polyethylene terephthalate, polyurethane, polytetrafluoroethylene, silicone rubber, neoprene and polyvinylidene chloride.

56. (original) The article of claim 55 wherein the first polymer is formed from a resin having a melt index between about 0.5 and about 8.0.

57. (original) The article of claim 55 wherein the first polymer is formed from a resin having a melt temperature between about 105°C and about 150°C.

58. (original) The article of claim 55 wherein the first polymer is a polyolefin selected from one or more of polyethylene, butene base, heptene base, octene base and metalacene polyethylene.

59. (original) The article of claim 46 wherein the article is selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.

60. (original) A bi-layer gas generating and releasing article formed from the article of claim 46 and a second article wherein a first surface of the article of claim 46 is conjoined with a surface of the second article.

61. (currently amended) The bi-layer article of claim 60 wherein the second article releases a gas upon exposure to moisture or electromagnetic energy.

62. (original) The bi-layer article of claim 60 wherein the second article does not release a gas.

MAC 9693
PATENT

63. (original) The bi-layer article of claim 60 wherein the second article is selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.

64. (original) A multi-layer gas generating and releasing article formed from the article of claim 46, a second article and a third article wherein a first surface of the article of claim 46 is conjoined with a surface of the second article and a second surface of the article of claim 46 is conjoined with a surface of the third article.

65. (original) The multi-layer article of claim 64 wherein the second article and the third article do not release a gas.

66. (currently amended) The multi-layer article of claim 64 wherein the second article releases a gas upon exposure to moisture or electromagnetic energy and the third article does not release a gas.

67. (currently amended) The multi-layer article of claim 64 wherein the second article and the third article independently release a gas upon exposure to moisture or electromagnetic energy.

68. (original) The multi-layer article of claim 64 wherein the second article and the third article are independently selected from a sheet, bag, envelope, pad, foam, insert, tray, cover, liner, carton, box, crate, pallet and bin.